9 September 2021

TO:

Mark D. Marini, Secretary
Department of Public Utilities
One South Station, 5th Floor
Boston, MA 02110

FROM:

Kirstin Beatty
Last Tree Laws Director
CENSORED ADDRESS

RE:

Petition of NSTAR Electric Company d/b/a Eversource Energy for approval of its Grid Modernization Plan for calendar years 2022 to 2025.	D.P.U. 21-80
Petition of Massachusetts Electric Company and Nantucket Electric Company each d/b/a National Grid for approval of its Grid Modernization Plan for calendar years 2022 to 2025.	D.P.U. 21-81
Petition of Fitchburg Gas and Electric Light Company d/b/a Unitil for approval of its Grid Modernization Plan for calendar years 2022 to 2025.	D.P.U. 21-82

Dear Secretary Marini:

Aggressive clean energy targets, such as evidenced in Chapter 8 of the Acts of 2021, An Act Creating a Next Generation Roadmap for Massachusetts Climate Policy, signed into law by Governor Baker to achieve 'net zero' emissions by 2050 as well as from programs like the Solar Massachusetts Renewable Target ('SMART') and the Massachusetts Clean Peak Energy Standard, can be met without the smart grid.[1]

1 Please see, for example, 21-80 Comments of The Berkshire-Litchfield Environmental Council (BLEC) https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/13939511

In *Environmental Health Trust v. Federal Communications Commission,* No. 20-1025 (D.C, Cir. 2021) the court held that the FCC failed to provide a reasoned explanation for deciding its radiofrequency guidelines are safe, and must reassess. [2]

Until the FCC has finalized reasoned radiofrequency guidelines, the department and utilities cannot mandate deployment of the smart grid.

To win this court opinion, Children's Health Defense and the Environmental Health Trust prepared an opening brief and presented 11,000 documents entered into the docket.

Instead of mandates, the department and utilities can take steps to reduce non-ionizing radiation.[3] Presently, instead, even more non-ionizing exposures have been proposed through continuation of or increased installation of:

- smart meters (wireless and digital non-ionizing exposures)
- base stations (wireless)
- remote operations (wireless and digital non-ionizing exposures)
- substantial digital operations (power quality problems leading to non-ionizing exposures)
- power line carriers [4] [5] (emanate non-ionizing exposures from power lines)

Eversource alone plans 6 western Massachusetts base stations in 2022, at a total cost of $3,482,807 and 4 more in 2023 at a cost of $2,321,871. [6] The price tag for Eversource base stations alone from 2022 through 2025 is $23,535,007 for a total of 24 Massachusetts base stations. To install this equipment despite a lack of reasoned guidelines must be considered 'arbitrary' and 'capricious', using the words of Judge Wilkins in the D.C. Circuit decision.

Also rather disturbing is the knowledge that utilities may rent space on base stations and other equipment for telecommunications companies to provide additional service.

Utilities even propose that smart grid surveillance is a 'customer benefit' as customers can see how energy is being used, as if customers were clamoring to trade privacy for this information. In the utility proposals and open docket, neither the department nor utilities consider addressing privacy, electrical safety, fire hazards, or cybersecurity issues as have been consistently brought forward by the public.[7]

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2 https://docs.fcc.gov/public/attachments/DOC-374936A1.pdf

3 For example, utilities provide power quality solutions to some businesses and are capable of adopting other solutions such as analog meters.

4 Power Line Communication turns electrical wires into radiating antennas. Available 8 Sept 2021 from https://www.eiwellspring.org/plc/PLC_antenna_effect.pdf

5 TWACS smart meters problematic to public health and safety. Available 9 September 2021 from https://www.eiwellspring.org/smartmeter/TWACS.pdf

6 NSTAR Electric Company d/b/a Eversource Energy 'AttachmentDPU-1-4(d)WirelessCommunicationsImprove' of the Company's responses to the First Set of Information Requests issued by the Department of Public Utilities. Motion for Protective Treatment of Confidential Information contained in Attachments DPU-1-2, DPU-1-4(b), DPU-1-4(c), and DPU-1-4(p). https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/13886937

7 Please refer to testimony critical of the smart grid, including attachments, in D.P.U. dockets 13-83, 12-76, 12-76-A, 21-80, 20-69, and 21-90. For example, Kirstin Beatty's formal statement and presentation in 20-69.

All links and references are hereby incorporated in full by reference.

The department appears to think non-ionizing exposures are minor. Non-ionizing smart grid exposures are not just limited to the small area around a smart meter:

1. Power quality problems can be shared throughout a neighborhood.
2. Non-ionizing radiation, such as from a power line carrier, can extend 60 meters or more from the power line.
3. Non-ionizing radio-frequency radiation from a base station can extend a mile or more and that from a smart meter felt on the street.
4. Visitors to a home, workplace, or public space with a smart meter or bank of smart meters can easily be within the biologically-active radius of non-ionizing radiation exposure.
5. A bank of smart meters can even exceed the 'arbitrary' and 'capricious' FCC guidelines.

Yet, the proposed smart grid modernization plans show no signs of limiting non-ionizing exposures, although National Grid appears to have censored away parts of its plans from public view.

The following, with some slight variation among utilities, describes utility grid modernization proposals for 2022 -2025, which are based upon upon the department decisions in Petition of NSTAR Electric Company and Western Massachusetts Electric Company, each d/b/a Eversource Energy for Approval by the Department of Public Utilities of their Grid Modernization Plan, D.P.U. 15-122 (May 20, 2018) and Grid Modernization:

1. 'Optimize system performance';
    a) Self-healing grid (automated through software to turn off circuit breakers, etc.);
    b) Remote visibility, control & command
        1. Advanced Sensing;
        2. Automated Feeder Reconfiguration (already exists);
        3. Urban Underground Automation (already exists);
        4. Distribution System Network Operator and Communications (SCADA, wireless);
        5. Real-time field telemetry with control room technology
    c) Monitoring and remote command
        1. Volt VAR Optimization and software investment;
            i. VVO software can monitors real-time voltages, watts, capacitors, voltage sensors, customer meters and issue control commands.
        2. Advanced inverter control;
        3. Load data analytics – advanced analytics of extremely large datasets
        4. Operational forecasting capabilities (day ahead, hour ahead)
    d) Wireless communications investments
        1. Substation relay upgrades;
        2. Increase capacity for transmission of data from field devices, building upon existing node deployments and FAN (industrial WiFi);[8]

8 Direct testimony of Jennifer A. Schilling. (2021 July 1) EXHIBIT ES-JAS-1: In support of NSTAR Electric Company d/b/a Eversource Energy 2022-2025 Electric Grid Modernization Plan Overview. Lines 13-17, page 13. https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/13720286

3. Upgrade feeder relay in substations and add feeder relays in distribution substations.
4. Continuous monitoring devices on feeders and substation equipment serving commercial and industrial customers with sensitive equipment;
5. Use of power lines to carry data (power line carrier or PLC)

2. Optimize system demand with customer pricing;
   a) Advanced Metering Infrastructure (AMI) investments (i.e. smart grid)
      1. With Eversource replacing over 740,000 AMR meters with AMI.[9]
      2. Provide analytics to determine how energy is used, and which appliances are using the most electricity, etc.[10]
   b) Time-varying electricity costs
3. Integrate distributed energy resources (through grid modernization)
   a) Energy storage investments
   b) Connect with Distributed energy resources (DER)

The above example highlights that wireless communications and poor power quality are the current basis of the smart grid, along with exceptional data capture.

Ample science exists to confirm the existence of a smart grid threat to public and environmental health, including from power quality, strong fields, and wireless exposures, including, but not limited to:

1. Low-frequency transients (power quality) coupling to children.[11]
2. Evidence that power quality causes obesity and diabetes[12]
3. Nervous system stimulation by kilohertz (power quality) frequencies[13]
4. Pseudoanemia triggered by static magnetic fields[14]
5. Hormonal, neurotransmitter alteration and other effects including heightened ALS from low frequency exposures[15] [16] [17] [18] [19]

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9 Direct testimony of Jennifer A. Schilling, Jessica Brahaney Cain, and Robert W. Frank. (2021 July 1) EXHIBIT ES-AMI-1: In support of NSTAR Electric Company d/b/a Eversource Energy. Line 7, page 23. https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/13720286

10 Direct testimony of Jennifer A. Schilling, Jessica Brahaney Cain, and Robert W. Frank. (2021 July 1) EXHIBIT ES-AMI-1: In support of NSTAR Electric Company d/b/a Eversource Energy. Page 29-30. https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/13720286

11 Ozen S (2008 Jan) Low-Frequency Transient Electric and Magnetic Fields Coupling to Child Body. Radiation Protection Dosimetry. Oxford University Press. 128(1):62-63

12 Milham S. Evidence that dirty electricity is causing the worldwide epidemics of obesity and diabetes. Electromagn Biol Med. 2014 Jan;33(1):75-8. doi: 10.3109/15368378.2013.783853. Epub 2013 Jun 19. PMID: 23781992.

13 Neudorfer C, Chow CT, Boutet A, Loh A, Germann J, Elias GJ, Hutchison WD, Lozano AM. Kilohertz-frequency stimulation of the nervous system: A review of underlying mechanisms. Brain Stimul. 2021 May-Jun;14(3):513-530. doi: 10.1016/j.brs.2021.03.008. Epub 2021 Mar

14 Elferchichi M, Mercier J, Ammari M, Belguith H, Abdelmelek H, Sakly M, Lambert K. Subacute static magnetic field exposure in rat induces a pseudoanemia status with increase in MCT4 and Glut4 proteins in glycolytic muscle. Environ Sci Pollut Res Int. 2016 Jan;23(2):1265-73. doi: 10.1007/s11356-015-5336-3. Epub 2015 Sep 10. PMID: 26358208

15 Tenforde TS. Biological interactions and potential health effects of extremely-low-frequency magnetic fields from power lines and other common sources. Annu Rev Public Health. 1992;13:173-96. doi: 10.1146/annurev.pu.13.050192.001133. PMID: 1599584.

16 Drzewiecka EM, Kozlowska W, Zmijewska A, Wydorski PJ, Franczak A. Electromagnetic Field (EMF) Radiation Alters Estrogen Release from the Pig Myometrium during the Peri-Implantation Period. Int J Mol Sci. 2021 Mar 13;22(6):2920. doi: 10.3390/ijms22062920. PMID: 33805726; PMCID: PMC7999543.

6. Electromagnetic sensitivity from non-ionizing radiation exposures [20]
7. Hundreds of other peer-reviewed studies showing harm from non-ionizing radiation exposures. [21] [22] [23] [24] [25]

Among the criticial evidence submitted is substantive personal, scientific, and medical testimony and documents provided to the department and utilities in dockets 13-83, 12-76, 12-76-A, 21-80, 20-69, and 21-90, hereby incorporated into this testimony.

Utilities, the department, and the Commonwealth wrongly assume that the smart grid is a necessary to address climate change. The smart grid is data, resource, and wireless intensive, and is therefore energy intensive.[26] [27] [28] [29] Fostering wireless poses a threat to the climate, as the intensity of levels in our environment approaches or exceeds thermal levels and thus contributes to global warming. Wireless heating is also a problem for bees and other insects.[30] [31] Further, wireless and strong fields from electricity are known to disrupt flora and fauna,

17 Kiray A, Tayefi H, Kiray M, Bagriyanik HA, Pekcetin C, Ergur BU, Ozogul C. The effects of exposure to electromagnetic field on rat myocardium. Toxicol Ind Health. 2013 Jun;29(5):418-25. doi: 10.1177/0748233711434957. Epub 2012 Feb 9. PMID: 22323476.

18 Chung YH, Lee YJ, Lee HS, Chung SJ, Lim CH, Oh KW, Sohn UD, Park ES, Jeong JH. Extremely low frequency magnetic field modulates the level of neurotransmitters. Korean J Physiol Pharmacol. 2015 Jan;19(1):15-20. doi: 10.4196/kjpp.2015.19.1.15. Epub 2014 Dec 31. PMID: 25605992; PMCID: PMC4297757

19 Huss A, Peters S, Vermeulen R. Occupational exposure to extremely low-frequency magnetic fields and the risk of ALS: A systematic review and meta-analysis. Bioelectromagnetics. 2018 Feb;39(2):156-163. doi: 10.1002/bem.22104. Epub 2018 Jan 19. PMID: 29350413.

20 Belyaev I, Dean A, Eger H, Hubmann G, Jandrisovits R, Kern M, Kundi M, Moshammer H, Lercher P, Müller K, Oberfeld G, Ohnsorge P, Pelzmann P, Scheingraber C, Thill R. EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses. Rev Environ Health. 2016 Sep 1;31(3):363-97. doi: 10.1515/reveh-2016-0011. PMID: 27454111.

21 Opening brief of Environmental Health Trust v. Federal Communications Commission, No. 20-1025 (D.C, Cir. 2021)

22 See Dr. Joel Moskowitz's 'Recent Research' on wireless and electromagnetic fields under the EMR Safety Home page under the heading "Recent Posts on EMR Safety" at SaferEMR.com. https://www.saferemr.com/2018/04/EMR-Safety.html – also see his posts under the same section on the immune system and thyroid cancer

23 Please refer to the resources at Phire Medical including the 2020 NIR Consensus Statement, available at https://phiremedical.org/2020-nir-consensus-statement-read/ and this list of WiFi studies available at https://phiremedical.org/wp-content/uploads/2020/03/WiFi-and-Device-Studies-Final-1.pdf

24 Please refer to testimony critical of the smart grid, including attachments, in D.P.U. dockets 13-83, 12-76, 12-76-A, 21-80, 20-69, and 21-90.

25 Please also see testimony by Patricia Burke on D.P.U. 21-80.

26 The Shift Project, "Lean ICT: Towards Digital Sobriety: Report on the Environmental Impact of Information and Communication Technologies," February 2019

27 Baliga et al. of the University of Melbourne, "Energy Consumption in Wired and Wireless Access Networks," IEEE Communications, June 2011

28 Shehabi et al., "United States Data Center Energy Usage Report," Berkeley Laboratory, 2016

29 Morley et al., Lancaster University, "Digitalisation, energy and data demand: The impact of Internet traffic on overall and peak electricity consumption," Energy Research and Social Science, 2018

30 Thielens et al., "Exposure of Insects to Radio-Frequency Electromagnetic Fields from 2 to 120 GHz" Scientific Reports volume 8, Article number: 3924 (2018)

31 Thielens, A., Greco, M.K., Verloock, L. et al. Radio-Frequency Electromagnetic Field Exposure of Western Honey Bees. Sci Rep 10, 461 (2020). https://doi.org/10.1038/s41598-019-56948-0

All links and references are hereby incorporated in full by reference.

such as bees, birds, and trees.[32] [33] Killing off bees and entire food webs does nothing to save our planet, and it is short-sighted to ignore this elephant in the room.

Another illusion of marketing appears to be costs.

Grid modernization costs for National Grid are enormous, with much of the costs generated by the 'need' for connectivity, including IT specialists and communications.[34] AMI costs for National Grid are given as $480.67 million *'net value'* over 20 years.[35] Net value is an interesting term, meaning that this is not the actual expenditure, but the cost after savings are subtracted.

However, National Grid's rendition of savings appears to be based on false assumptions, for 'customer benefits' are listed as saving $327.54 million and 'societal benefits' as saving $55.07 million.[36] National Grid's accounting should instead recognize the cost of liability to customers from pressing forward with these investments.

Again, the smart grid is associated with ill health, billing errors, privacy transgressions, expense, and, moreover, customers generally do not use the tools to assess and reformulate energy use.[37] [38] [39] [40] The benefits are questionable, problems numerous. This information has already been shared in existing and and related dockets, and so it is time for the department and utilities to respond responsibly.

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32 Shepherd et al., Extremely Low Frequency Electromagnetic Fields impair the Cognitive and Motor Abilities of Honey Bees, Scientific Reports volume 8, Article number: 7932 (2018)

33 Waldmann-Selsam, C., et al. "Radiofrequency radiation injures trees around mobile phone base stations." Science of the Total Environment 572 (2016): 554-69.

34 GridModPlanAllCost. Company's responses to the Department of Public Utilities' First Set of Information Requests. Motion for Protective Treatment of Confidential Information contained in Attachments DPU-1-2-3(b), DPU-1-2-15(a), DPU-1-2-15(b), DPU-1-2-20(a), and DPU-1-2-20(b).

35 Massachusetts Electric Company and Nantucket Electric Company d/b/a National Grid D.P.U. 21-81 Exhibit NG-AMI-1 (July 1, 2021) p. 27 https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/13719694

36 Ibid. p. 30

37 F. Leferink, C. Keyer and A. Melentjev, "Static energy meter errors caused by conducted electromagnetic interference," in IEEE Electromagnetic Compatibility Magazine, vol. 5, no. 4, pp. 49-55, Fourth Quarter 2016, doi: 10.1109/MEMC.2016.7866234.

38 Karin Hieta, Valerie Kao, Thomas Roberts (2012 March) Case Study of Smart Meter System Deployment. CA Division of Ratepayer Advocates (DRA). Available at https://smartmeterharm.files.wordpress.com/2014/07/dra-report-sce-public-benefits-3-12.pdf

39 Sarah Darby (2010) Smart metering: what potential for householder engagement?, Building Research & Information, 38:5, 442-457, DOI: 10.1080/09613218.2010.492660

40 In particular please see Kirstin Beatty's formal reply in docket 20-69 and also the presentation on the Smart Grid in docket 20-69 for further references, as well as the testimony on docket 21-80 by Blake Levitt and Starling Childs of the Berkshire-Litchfield Council.

All links and references are hereby incorporated in full by reference.